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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/574,140
Filing Date: March 29, 2006
Appellant(s): KARMAN ET AL.

Michael Marcin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 15, 2010 appealing from the Office action mailed April 8, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-22 and 24-35 are currently pending. Claims 1-22 and 24-35 are currently rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

Balogh, Tibor US Patent Publication No. 2001/0028356 dated October 11, 2001

7,113,159	Sawabe	9-2006
6,172,807	Akamatsu	1-2001
6,386,720	Mochizuki	4-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-13, 22, 24-26, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balogh (US Patent Publication No. 2001/0028356) in view of Sawabe (US Patent No. 7,113,159).

With reference to claim 1, Balogh teaches a display device for displaying a three dimensional image such that different views are displayed according to the different viewing angles, the display device including:

a display panel having a plurality of separately addressable pixels for displaying said image, the pixels being grouped such that different pixels in a group correspond to different views of the image as a function of an angle with respect to a first axis, each pixel in a group being positioned relative to a respective discrete light source (see paragraph 32, lines 3-4 and paragraph 39, lines 1-7); and

a display driver for controlling an optical characteristic of each pixel to generate an image according to received image data (see paragraph 47).

Balogh fails to teach an intensity compensation device for further controlling light transmission characteristics of pixels within a group to compensate for an angular size of view, of the respective light source, via said pixels.

Sawabe teaches an intensity compensation device (3) for further controlling light transmission characteristics of pixels within a group to compensate for an angular size of view, of the respective light source, via said pixels in a second axis of the display panel, wherein the second axis is transverse to the first axis (see column 7, lines 41-44 and column 1, lines 43-46).

The LUT taught by Sawabe is used to adjust pixel data values that vary according to a viewing angle. Specifically, Sawabe teaches a viewing angle characteristic which provides different view of an image based on the angle upon which the display is viewed. The LUT then compensates for the viewing angle characteristic ("light transmission characteristic" as cited in the claim) for all pixels, which lie in "a second axis of the display," i.e. the x-axis of the display. It would have been obvious to one of ordinary skill in the art at the time of invention that the image intensity varies according to the viewing angle at which the display is observed, such that it would be necessary to compensate pixel intensities at wider viewing angles to ensure that all viewers, regardless of location, are able to view a correct image.

With reference to claim 2, Balogh and Sawabe teach all that is required with reference to claim 1, and Balogh further teaches a back panel for providing a plurality of said discrete light sources, each group of pixels in the display panel being positioned to receive light from a respective one of the discrete light sources (see paragraph 34, lines 1-3).

With reference to claim 3, Balogh and Sawabe teach all that is required with reference to claim 2, and Balogh further teaches that that the back panel provides a plurality of line sources of illumination (see paragraph 8, lines 3-6).

With reference to claim 4, Balogh and Sawabe teach all that is required with reference to claim 2, and Balogh further teaches that the back panel provides a plurality of point sources of illumination (see paragraph 34, lines 1-3).

With reference to claim 5, Balogh and Sawabe teach all that is required with reference to claim 2, and Balogh further teaches that the display panel is a light-transmissive display panel adapted for viewing from a side opposite to the side on which the back panel is located (see paragraph 7, lines 1-5).

With reference to claim 6, Balogh and Sawabe teach all that is required with reference to claim 1, and Balogh further teaches a lenticular array (20) positioned adjacent to the display panel, each lenticle within the lenticular array focusing light from selected pixels in the display panel (see paragraph 36, lines 1-5).

With reference to claim 7, Balogh and Sawabe teach all that is required with reference to claim 6, and Balogh further teaches that each lenticle within the lenticular array is associated with a group of pixels (see Figure 2b).

With reference to claim 8, Balogh and Sawabe teach all that is required with reference to claim 1, and Sawabe teaches that the display driver (2) and intensity compensation device (3) in combination are adapted to control the amount of light passing through each pixel according to an image to be displayed (see column 7, lines 35-40).

With reference to claim 9, Balogh and Sawabe teach all that is required with reference to claim 1, and Sawabe further teaches that the intensity compensation device comprises a look-up table containing correction values to be applied in respect of each pixel within a group (see column 7, lines 41-44).

With reference to claim 10, Balogh and Sawabe teach all that is required with reference to claim 9, and Sawabe further teaches that the correction values are selected so as to substantially normalise an intensity displayed by a group of pixels to be independent of viewing angle (see column 7, lines 41-44).

With reference to claim 11, Balogh and Sawabe teach all that is required with reference to claim 9, and Sawabe further teaches that the look-up table includes substitution values or offset values as a function of viewing angle to be applied to a frame store (see column 7, lines 41-48).

With reference to claim 12, Balogh and Sawabe teach all that is required with reference to claim 1, and Sawabe further teaches that the intensity compensation device is adapted to adjust a pixel drive voltage and/or current received from the display driver (see column 7, lines 41-48).

With reference to claim 13, Balogh and Sawabe teach all that is required with reference to claim 12, and Sawabe further teaches that the intensity compensation device provides a voltage and/or current offset to the pixel drive voltage and/or current received from the display driver (see column 7, lines 41-48).

With reference to claim 22, Balogh teaches a method for displaying a three dimensional image on a display device such that different views of the image are displayed according to different viewing angles, the method comprising the steps of:

processing image data to form pixel intensity data values for each one of a plurality of separately addressable pixels in a display panel, the pixels being grouped such that different pixels in a group correspond to different views of the image as a function of an angle with respect to a first axis, and each pixel in a group being positioned relative to a respective discrete light source, the pixel intensity data values each for controlling light transmission characteristics of a respective pixel to generate the image (see paragraph 32, lines 3-4, paragraph 39, lines 1-7, and paragraph 47).

Balogh fails to teach intensity correction of pixel values.

Sawabe teaches applying intensity correction values to at least some pixel data values within each group to compensate for an angular size of view, of the respective light source, via said pixels, in a second axis of the display panel, wherein the second axis is transverse to the first axis, by controlling an amount of light from the respective discrete light source passing through each pixel according to a three dimensional image to be displayed (see column 7, lines 41-48 and column 1, lines 43-46); and

using the corrected pixel data values to drive pixels of the display panel to generate said image (see column 7, lines 35-40).

The LUT taught by Sawabe is used to adjust pixel data values that vary according to a viewing angle. Specifically, Sawabe teaches a viewing angle characteristic which provides different view of an image based on the angle upon which

the display is viewed. The LUT then compensates for the viewing angle characteristic ("light transmission characteristic" as cited in the claim) for all pixels, which lie in "a second axis of the display," i.e. the x-axis of the display. It would have been obvious to one of ordinary skill in the art at the time of invention that the image intensity varies according to the viewing angle at which the display is observed, such that it would be necessary to compensate pixel intensities at wider viewing angles to ensure that all viewers, regardless of location, are able to view a correct image.

With reference to claim 24, Balogh and Sawabe teach all that is required with reference to claim 22, and Sawabe further teaches that the intensity correction values are obtained from a look-up table (3) containing correction values to be applied in respect of each pixel within a group (see column 7, lines 41-48).

With reference to claim 25, Balogh and Sawabe teach all that is required with reference to claim 22, and Sawabe further teaches that the intensity correction values are selected so as to substantially normalise an intensity displayed by a group of pixels to be independent of a viewing angle (see column 7, lines 41-44).

With reference to claim 26, Balogh and Sawabe teach all that is required with reference to claim 22, and Sawabe further teaches that the intensity correction values are used to adjust a pixel drive voltage and/or current applied to the display panel (see column 7, lines 41-48).

With reference to claim 35, Balogh and Sawabe teach all that is required with reference to claim 22, and it is further inherent that a display as taught by Balogh (see claim 1) would be controlled by a computer, such that the method of claim 22 would be

carried out according to instructions provided from a computer program stored on a storage medium in the computer.

Claims 14-17 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balogh in view of Sawabe as applied to claims 1 and 22 above, and further in view of Akamatsu (US Patent No. 6,172,807).

With reference to claim 14, Balogh and Sawabe teach all that is required with reference to claim 1, but fail to teach that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of a linear viewing angle dimension of each pixel.

Akamatsu teaches that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of a linear viewing angle dimension of each pixel (see column 5, lines 60-67).

It would have been obvious to one of ordinary skill in the art at the time of invention that the linear dimension of a pixel will affect the amount of light able to be transmitted through the pixel, and that by compensating for the length of the pixel, transmission can be increased or decreased as necessary to create an allover equal brightness level.

With reference to claim 15, Balogh and Sawabe teach all that is required with reference to claim 1, but fail to teach that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of an areal viewing angle dimension of each pixel.

Akamatsu teaches that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of an areal viewing angle dimension of each pixel (see column 6, lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time of invention that the areal dimension of a pixel will affect the amount of light able to be transmitted through the pixel, and that by compensating for the area of the pixel, transmission can be increased or decreased as necessary to create an allover equal brightness level.

With reference to claim 16, Balogh and Sawabe teach all that is required with reference to claim 1, but fail to teach that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of the angle subtended by a linear dimension of a pixel relative to its respective discrete light source.

Akamatsu teaches that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of the angle subtended by a linear dimension of a pixel relative to its respective discrete light source (see column 5, lines 60-67).

It would have been obvious to one of ordinary skill in the art at the time of invention that the viewing angle transmission deficiency arises due to a pixel displaced linearly from the light source, such that the angle formed between the pixel and the light source determines the amount of decrease in light transmission. Therefore, by compensating for this angle, transmission can be increased as necessary to create an allover equal brightness level.

With reference to claim 17, Balogh and Sawabe teach all that is required with reference to claim 1, but fail to teach that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of the angle subtended by an areal dimension of a pixel relative to its respective discrete light source.

Akamatsu teaches that the intensity compensation device is adapted to further control optical characteristic of pixels within a group as a function of the angle subtended by an areal dimension of a pixel relative to its respective discrete light source (see column 6, lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time of invention that the viewing angle transmission deficiency arises due to a pixel displaced both vertically and horizontally from the light source, such that the angle formed between the pixel and the light source determines the amount of decrease in light transmission. Therefore, by compensating for this angle, transmission can be increased as necessary to create an allover equal brightness level.

With reference to claim 27, Balogh and Sawabe teach all that is required with reference to claim 22, but fail to teach that the intensity correction values are determined according to a function of a linear viewing angle dimension of each pixel in a group.

Akamatsu teaches that the intensity correction values are determined according to a function of a linear viewing angle dimension of each pixel in a group (see column 5, lines 60-67).

It would have been obvious to one of ordinary skill in the art at the time of invention that the linear dimension of a pixel will affect the amount of light able to be transmitted through the pixel, and that by compensating for the length of the pixel, transmission can be increased or decreased as necessary to create an allover equal brightness level.

With reference to claim 28, Balogh and Sawabe teach all that is required with reference to claim 22, but fail to teach that the intensity correction values are determined according to a function of an areal viewing angle dimension of each pixel in a group.

Akamatsu teaches that the intensity correction values are determined according to a function of an areal viewing angle dimension of each pixel in a group (see column 6, lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time of invention that the areal dimension of a pixel will affect the amount of light able to be transmitted through the pixel, and that by compensating for the area of the pixel, transmission can be increased or decreased as necessary to create an allover equal brightness level.

With reference to claim 29, Balogh and Sawabe teach all that is required with reference to claim 22, but fail to teach that the intensity correction values are determined according to a function of the angle subtended by a linear dimension of a pixel relative to its respective discrete light source.

Akamatsu teaches that the intensity correction values are determined according to a function of the angle subtended by a linear dimension of a pixel relative to its respective discrete light source (see column 5, lines 60-67).

It would have been obvious to one of ordinary skill in the art at the time of invention that the viewing angle transmission deficiency arises due to a pixel displaced linearly from the light source, such that the angle formed between the pixel and the light source determines the amount of decrease in light transmission. Therefore, by compensating for this angle, transmission can be increased as necessary to create an allover equal brightness level.

With reference to claim 30, Balogh and Sawabe teach all that is required with reference to claim 22, but fail to teach that the intensity correction values determined according to a function of the angle subtended by an areal dimension of a pixel relative to its respective discrete light source.

Akamatsu teaches that the intensity correction values determined according to a function of the angle subtended by an areal dimension of a pixel relative to its respective discrete light source (see column 6, lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time of invention that the viewing angle transmission deficiency arises due to a pixel displaced both vertically and horizontally from the light source, such that the angle formed between the pixel and the light source determines the amount of decrease in light transmission. Therefore, by compensating for this angle, transmission can be increased as necessary to create an allover equal brightness level.

Claims 19-21 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balogh in view of Sawabe as applied to claims 1 and 22 above, and further in view of Mochizuki (US Patent No. 6,386,720).

With reference to claim 19, Balogh and Sawabe teach all that is required with reference to claim 1, but fail to teach that inherent optical characteristics of the display panel are configured such that viewing angle dependence is reduced or substantially minimised relative to the first axis, which is a y-axis.

Mochizuki teaches that inherent optical characteristics of the display panel are configured such that viewing angle dependence is reduced or substantially minimised relative to the first axis, which is a y-axis (see column 5, line 66 to column 6, line 11).

It would have been obvious to one of ordinary skill in the art at the time of invention that on-axis pixels would not be affected by viewing angle dependence, but that pixels on either side of the y-axis would be, and that any pixels can be compensated for using the above process as necessary to reduce intensity discrepancies.

With reference to claim 20, Balogh, Sawabe, and Mochizuki teach all that is required with reference to claim 19, and Mochizuki further teaches that the intensity compensation device serves to reduce or substantially minimise viewing angle dependence relative to the second axis which is an x-axis, where the second axis is orthogonal to the y-axis (see column 5, line 66 to column 6, line 11).

With reference to claim 21, Balogh, Sawabe, and Mochizuki teach all that is required with reference to claim 20, and Mochizuki further teaches that the x-axis is

defined as the horizontal axis when the object is in normal use, and the y-axis is defined as the vertical axis when the object is in normal use (see column 5, line 66 to column 6, line 11 and Figure 10).

With reference to claim 32, Balogh and Sawabe teach all that is required with reference to claim 22, but fail to teach the step of configuring the inherent optical characteristics of the display panel such that viewing angle dependence is reduced or substantially minimised relative to the first axis which is a y-axis.

Mochizuki teaches the step of configuring the inherent optical characteristics of the display panel such that viewing angle dependence is reduced or substantially minimised relative to the first axis which is a y-axis (see column 5, line 66 to column 6, line 11).

It would have been obvious to one of ordinary skill in the art at the time of invention that on-axis pixels would not be affected by viewing angle dependence, but that pixels on either side of the y-axis would be, and that any pixels can be compensated for using the above process as necessary to reduce intensity discrepancies.

With reference to claim 33, Balogh, Sawabe, and Mochizuki teach all that is required with reference to claim 32, and Mochizuki further teaches that the intensity correction values are applied to reduce or substantially minimise viewing angle dependence relative to the second axis which is an x-axis, wherein the second axis that is orthogonal to the y-axis (see column 5, line 66 to column 6, line 11).

With reference to claim 34, Balogh, Sawabe, and Mochizuki teach all that is required with reference to claim 33, and Mochizuki further teaches that the x-axis is the horizontal axis when the display panel is in normal use, and the y-axis is the vertical axis when the display panel is in normal use (see column 5, line 66 to column 6, line 11 and Figure 10).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-22 and 24-35 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-18 and 20-27 of copending Application No. 10/574,142. Although the conflicting claims are not identical, they are not patentably distinct from each other because both inventions are directed to modification of an optical characteristic by controlling the intensity/grey scale level of the data. Claim 1 of the current invention teaches a display panel and driver of a three dimensional image display device, and an intensity compensation device that compensates for the viewing angle. Claim 1 of the copending application teaches the same display panel and driver of a three dimensional image display device, and a grey scale compensation device that compensates for the viewing angle. Intensity of the data and grey scale of the data are equivalent concepts, such that the current and copending applications carry out the same function and are not patentably distinct.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Allowable Subject Matter

Claims 18 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(10) Response to Argument

Appellant argues that Sawabe fails to teach "an intensity compensation device for further controlling light transmission characteristics of pixels within a group to compensate for an angular size of view" (see page 5). Examiner respectfully disagrees, citing both the abstract and column 7, lines 41-44, in which Sawabe discloses a look-up table which is used to convert image data to correct image gradation at a wide angle. Sawabe is adjusting a group of pixels based on the correction values in the look-up table to compensate the wide angle position, which is an angular size of view, as recited in claim 1.

As to Appellant's argument that Sawabe is not directed to a three-dimensional display, Examiner points out that the three-dimensional aspect of the invention is only disclosed in the preamble of the claim, and is not tied to any of the limitations in the body of the claim, such that it is not necessary to be considered when referencing the prior art. The claim limitation that Appellant has pointed out, "the pixels being grouped such that different pixels in a group correspond to different view of the image as a function of an angle with respect to a first axis" does not specifically pertain to a three-dimensional display or image, and is vague and can be broadly interpreted. As it is interpreted in relation to the reference Sawabe, each of the pixels within a group

presents a different piece of the image (and therefore a different view), and each pixel is positioned relative to a central axis of the display, with the position of each portion of the image being displayed by the pixel having an angular relation to the central axis. The language of the claim limitation does not specify that each pixel functions as pixels of a three-dimensional display do, each projecting the same image in a different direction. In addition, Appellant has argued that a two-dimensional display is not limited to a viewing angle. However, the fact that Sawabe corrects for a viewing angle contradicts this argument. While Appellant contends that "viewers at different viewing angles are not seeing the same pixels, they are seeing the pixels that correspond to the viewing angle at which they are viewing the display," this language is not included in the claim, and the language of the claim is not such as to specify beyond what is taught by Sawabe, that the image data is corrected for a viewing angle. Appellant has discussed that the correction of Sawabe would be improper if applied to all the pixels in the group, but the claim language merely discusses controlling the pixels within a group, rather than individually controlling a correction factor to be applied to each pixel. Generally, Appellant appears to be arguing that Sawabe fails to teach individually correcting pixel values for a three-dimensional display which projects the image from each pixel in a different direction, but the claim language does not reflect these arguments. The Sawabe reference, in combination with the Balogh reference, teaches all the limitations of the claim as currently written.

As to Appellant's argument of the Akamatsu reference, it has already been shown that Balogh and Sawabe teach all the limitations of claims 1 and 22, and as such Akamatsu is not required to fulfill any deficiencies in these two references.

As to Appellant's argument of the Mochizuki reference, it has already been shown that Balogh and Sawabe teach all the limitations of claims 1 and 22, and as such Mochizuki is not required to fulfill any deficiencies in these two references.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Ilana Spar/

Examiner, Art Unit 2629

Conferees:

/Bipin Shalwala/

Supervisory Patent Examiner, Art Unit 2629

/Amare Mengistu/

Supervisory Patent Examiner, Art Unit 2629